

REMARKS

I. Status of the Application

Claims 1-23 were pending in the Application as of the date of the Office Action. In the Office Action, the Examiner:

(a) rejected Applicants' traversal of a prior restriction requirement, withdrawing claims 12-23 from consideration;

(b) rejected claim 11 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention; and

(c) rejected claims 1-11 under 35 U.S.C. § 102(b) as allegedly being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent No. 5,051,454 to Lemon et al. ("Lemon").

In this Response, Applicants cancel claim 11, add new claim 35, and respectfully submit the following comments. Claims 1-10 remain in the Application but are not currently amended. Applicants respectfully submit that the following remarks herein traverse or overcome the Examiner's rejections to the Application, placing claims 1-10 and 35 in a condition for allowance.

II. No New Matter Is Introduced by Way of Amendment.

Applicants respectfully submit that no new matter has been added by adding new claim 35. Specifically, new claim 35 depends from claim 1 and has support within the specification of the Application at paragraphs [0035], [0069], [0100], and [0101]. Accordingly, Applicants

request that new claim 35 be entered and that the Application proceed to allowance for the reasons provided herein.

III. Previous Restriction Requirement

In the Office Action, the Examiner acknowledged Applicants' election of the claims of Group I (claims 1-11) with traverse, but did not find Applicants' arguments persuasive and therefore made the restriction requirement final. Office Action, pages 2 and 3. The Examiner concluded his comments with the statement that "[t]he Applicants are reminded that if the elected claims are found allowable, the rejected claims can be rejoined if they are drawn to the same limitations of the allowed claims." Office Action, page 3.

Applicants respectfully submit that no additional argument will be made in this Response regarding the restriction requirement, and that Applicants continue to reserve their rights to either rejoin the claims once a claim is allowed or in one or more continuation applications. As discussed in this Response, Applicants believe the claims should be rejoined.

IV. The Rejection of Claim 11 under 35 U.S.C. § 112, Second Paragraph, is Overcome and Should be Withdrawn.

In the Office Action, the Examiner rejected claim 11 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. In response, Applicants cancel claim 11, rendering the present rejection moot. As such, Applicants respectfully request that the rejection of claim 11 under 35 U.S.C. § 112, second paragraph, be withdrawn.

V. **The Rejection of Claims 1-11 under 35 U.S.C. § 102(b), or in the Alternative, Under 35 U.S.C. § 103(a), is Overcome and Should be Withdrawn.**

Applicant respectfully submits that the rejection of claims 1-11 under 35 U.S.C. § 102(b), or in the alternative, under 35 U.S.C. § 103(a) should be withdrawn because (i) Lemon does not disclose all the limitations of independent claim 1, (ii) Lemon does not render claim 1 obvious, and (iii) claim 11 has been cancelled. Because the claim has been cancelled, Applicants do not address the merits of the Examiner's rejection to claim 11.

A. **The Rejection of Claims 1-10 under 35 U.S.C. § 102(b) Should be Withdrawn.**

Applicants respectfully submit that the rejection of claims 1-10 should be withdrawn because Lemon does not disclose all the limitations of Claim 1. A prior art patent, publication, or event is only anticipating under 35 U.S.C. § 102(b) if the prior art patent, publication or event discloses each and every limitation found in the claims, either expressly or inherently. *Rockwell Intern. Corp. v. U.S.*, 147 F.3d 1358, 1363 (Fed. Cir. 1998); *Electro Med Sys. S.A. v. Cooper Life Sciences*, 34 F.3d 1048, 1052 (Fed. Cir. 1994); *see also* MPEP § 2131.01 ("A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.") An omission of any claimed element, *no matter how insubstantial*, is grounds for traversing a rejection based on 35 U.S.C. § 102. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542 (Fed. Cir. 1983).

1. **Applicants' Claim 1 is Patentable Over Lemon.**

Applicants' respectfully submit that Lemon cannot possibly be used to produce Applicants' claimed "electrode comprising a conductive material-doped ester-cured alkaline

phenolic resole resin containing conducting alkaline salts", and as such, Lemon does not anticipate claim 1.

a. Lemon

Lemon discloses the preparation of a range of esterified resoles and describes various examples of reactions with alkalis. A number of application examples are provided within Lemon, one of which ("Application Example 4 – Refractory Binding", appearing in col. 21 of Lemon) describes how resole esters could be used as refractory binders.

A refractory product is used in very high temperature applications, such as in the production of steel. Refractory products include, for example, bricks for furnace linings, crucibles, and sliding gates. The process for making a refractory brick is described in the "Application Example 4 – Refractory Bonding" example of Lemon. In that example, Lemon states that "[t]he following samples of gelled material were submitted to thermal gravimetric analysis at 750°C in air and nitrogen atmospheres", with the results shown in the table appearing in col. 21 (reproduced below).

| Composition | TGA at 750° C. | | | | Carbon yield. N ₂ theor. residue |
|---|----------------|---------------------------------------|---------------------------------|-----------------------|--|
| | % in air | Theoretical inorganic residue % | % Carbon remaining in air | % in N ₂ % | |
| Product IVb acetate (4.0 g) 50% KOH (1.4 g) | 25.9 | 17.6 | 8.3 | 43.3 | 25.7 |
| Product IVb acetate (4.0 g) CaO (0.4 g) Water (0.5 g) | 42.3 | 9.1 | 33.2 | 45.3 | 36.2 |
| Product V formate (4.0 g) CaO (0.75 g) Water (0.5 g) | 16.1 | 12.0 | 4.1 | 51.9 | 39.9 |
| Product V formate (4.0 g) MgO (0.5 g) Water (0.5 g) | 22.0 | 11.1 | 10.9 | 54.4 | 31.1 |

Lemon, col. 21, lines 23-43, emphasis added.

The following description of brick formation in Lemon, provided after the reference of "bonded carbon electrodes", comprises the combination of mixing 85g of magnesia, 15g graphite, and 10g of "Product IVb (acetate ester)." Lemon, col. 21, lines 50-54. This combination of products was then "pressed into a cylindrical brick shape at 2 t/inch², cured at room temperature, *and then post-cured at the following temperatures for the following times, in order:*

Step 1. 100°C for 66 hours

Step 2. 150°C for 24 hours

Step 3. 850°C for 5 hours.

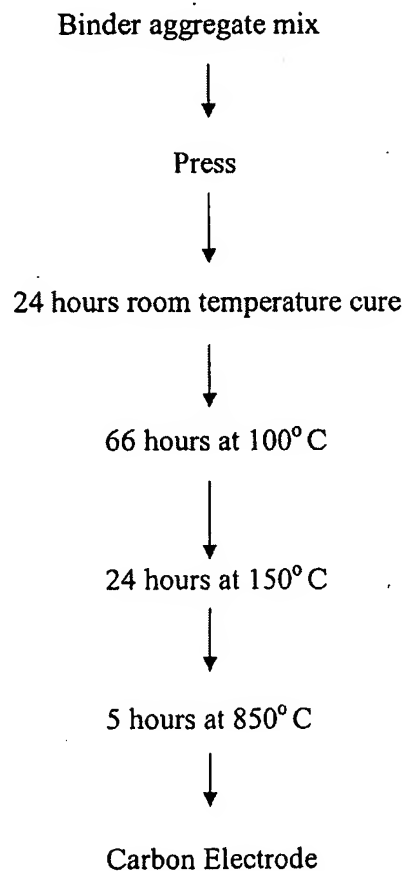
Lemon, col. 21, lines 56-60. Regarding the final heating step to an extremely high 850°C, Lemon states that "[t]he samples were then heated in a muffle furnace at 850°C for 5 hours to yield a *refractory material*." Lemon, col. 21, lines 59-60, emphasis added.

The reference to bonded carbon electrodes (Lemon, col. 21, line 50) is made because the process of making bonded carbon electrodes is the same as the process for making a refractory brick. Carbon electrodes are used in high temperature electrochemical processes. To make a traditional carbon electrode, as disclosed within Lemon, graphite is bonded with a binder. Lemon, col. 21, lines 50-54. Regarding traditional electrodes (including those of Lemon), it is then necessary to "carbonize" the binder at high temperature leaving only the carbon from the binder contributing to the total carbon in the electrode. The higher the carbon yield, the longer the operating life of the electrode.

In a high temperature process, as taught by Lemon, the ester and the phenolic resin will be carbonized, and the salts will be converted to oxides. This high temperature process coupled

with the salt conversion results in a final composition that is not an ester cured alkaline phenolic resole resin containing conductive salts, because the salts have been oxidized and the ester and resin have been carbonized.

In summary, the process for preparing a carbon electrode of Lemon comprises the following steps:



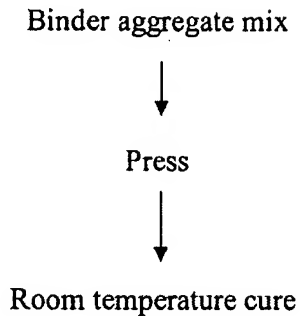
b. The Present Application

The present Application, contrary to the disclosure of Lemon, provides a process for making electrodes that does not involve the steps of heating the mixture "to yield a refractory material" as required by Lemon. Specifically, and as described in Examples 1-4 of the present Application (paragraphs 0080-0087), the steps of preparing an exemplary "conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts" for use with an electrode, as claimed in Applicants' claim 1, are as follows:

- Step 1:** Combine 50g resin, 100g graphite, 50g water, and 10g butyrolactone.
- Step 2:** Allow the mixture to harden/cure at room temperature.
- Step 3:** Form the hardened mixture into a cylinder and secure to a rotating disc electrode to produce a rotating cylinder electrode (RCE).

Application, paragraphs 0081-0083. An exemplary resin used in Step 1 of this process is made as described in paragraph 0080 of the Application, whereby phenol, a first amount of sodium hydroxide, two amounts of formalin, and a second sodium hydroxide amount are combined in a reaction vessel at various times and temperatures. The actual preparation of the "conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts", as disclosed by the process referenced above does not involve any increase in temperature that may either carbonize and/or oxidize any of the reactants.

In summary, an exemplary process for preparing a mixture for use with an electrode of the following Application comprises the following steps:



c. Process Comparison

As referenced above, Applicants respectfully submit that Applicants process differs from Lemon in that Applicants' process of producing the "conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts" for use with electrodes does *not* involve any heating steps that may either carbonize and/or oxidize any of the reactants, thereby destroying the intended end product.

As referenced above, and in connection with at least the step in Lemon of heating the exemplary mixture to 850°C for 5 hours to form a refractory "brick", such a heating step at that high temperature has the effect of carbonizing the ester and the phenolic resin and converting the salts to oxides. As such, the final product produced by the Lemon process cannot result in a "conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts", as claimed in Applicants' claim 1, because the final product produced by the Lemon process would carbonize any ester (hardener/curing agent) and phenolic resin that may have existed within a mixture of Lemon prior to the step of heating the exemplary mixture to 850°C for 5 hours to form a refractory brick.

As previously discussed herein, the preparation of a traditional electrode (referred to as a "bonded carbon electrode" in Lemon) includes such a carbonization step (high heat over time) so

that only the carbon from the binder contributes to the total carbon within an electrode. As such, and regardless of the composition of the mixture of magnesia, graphite, and ester disclosed in Lemon, the carbonization step effectively removes the ester and phenolic resin, leaving only carbon behind. For at least these reasons, Applicants respectfully submit that such a resulting product could not be a "conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts", as claimed in claim 1 of the Application.

In addition, the final product produced by Lemon cannot result in a "conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts" as claimed in claim 1, because the step of heating the mixture to 850°C for 5 hours would also convert those salts into oxides. As referenced in the beginning of Lemon, "the presence of free alcohol *and salt* in the cured composition is considered to be disadvantageous in other applications for which ester-cured phenolics might be considered, particularly where there is a need for high electrical resistance and/or water resistance." Lemon, col. 1, lines 39-44, emphasis added. As such, Applicants respectfully submit that not only does the heating step of 850°C for 5 hours in Lemon convert the salts to oxides, *Lemon expressly teaches away* from the presence of salts in a final product, such as an electrode, where high electrical resistance and/or water resistance is required. As such, the final product produced by the Lemon process cannot result in a resin "containing conducting alkaline salts" as claimed in Applicants' claim 1.

d. Conclusion

In conclusion, Applicants respectfully submit Lemon does not disclose a "conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts" as claimed in Applicants claim 1. As referenced above, "[a] claim is anticipated only if each and

every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." MPEP § 2131.01. The process of Lemon, as described herein, effectively oxidizes any salt and carbonizes any ester or resin present therein, thus precluding any sort of resole resin containing alkaline salts as claimed in the present Application. Because Lemon does not disclose each and every element as found in claim 1, Applicants respectfully submit that claim 1 is clearly patentable over Lemon, and Applicants respectfully submit that the rejection of Applicants' claim 1 as being anticipated by Lemon under 35 U.S.C. § 102(b) is overcome and should be withdrawn. Moreover, Applicants respectfully submit that the rejection of claims 2-10 as being anticipated by Lemon should be withdrawn because each of these claims depend from and incorporate all the limitations of claim 1.

B. The Rejection of Claims 1-10 Under 35 U.S.C. § 103(a) Should be Withdrawn.

Applicants respectfully submit that a *prima facie* case of obviousness under 35 U.S.C. § 103(a) was not made in the rejection of claims 1-11 of the present Application, and as such, the rejection of claims 1-11 under 35 U.S.C. 103(a) is improper and should be withdrawn.

As stated in the Manual of Patent Examining Procedure ("MPEP"), "[t]he examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness." MPEP at § 2141. The examiner needs to step into the "shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made" and determine "whether the claimed invention "as a whole" would have been obvious at the that time to that person." *Id.* (emphasis added). After performing such an analysis, an examiner must then articulate the findings of fact concerning the state of the art and the teachings of the references

applied, and should provide an explicit analysis supporting the obviousness rejection under 35 U.S.C. § 103(a) to properly establish a *prima facie* case of obviousness. *Id.*; *see also*, *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727, 1740-41 (2007). "If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." MPEP at § 2141.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness because the Examiner has not offered an explicit analysis as to why claims 1-11 are obvious and is merely basing the finding of obviousness on conclusory statements. "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l*, 127 S.Ct. at 1741 (*quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Here, the Examiner offers no reasoning as to why claims 1-10 would be obvious over Lemon and instead, merely states that claims 1-10 "are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lemon." Office Action, page 5.

Moreover, Applicants respectfully submit that even if the burden for establishing a *prima facie* case of obviousness is met, Lemon cannot serve as the basis for an obviousness rejection because it teaches away from the claimed invention and does not disclose all the limitations of claims 1-10. A *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. MPEP § 2144.05, *see also In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997). As referenced within the present Response, Lemon teaches that the presence of salt in a cured composition "is

considered to be *disadvantageous* in other applications for which ester-cured phenolics might be considered, particularly where there is a need for high electrical resistance and/or water resistance." Lemon, col. 1, lines 39-44, emphasis added. In contrast, claim 1 of the Application claims "a conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts" (emphasis added). Because Lemon teaches that the presence of salts in a cured composition is disadvantageous and claim 1 claims a cured resin that contains salts, Applicants respectfully submit that Lemon teaches away from the claimed invention and cannot serve as the basis for an obviousness rejection.

Moreover, the question of obviousness in view of Lemon is clearly resolved in favor of Applicants. As required under *Graham v. John Deere Co.*, the first steps in determining obviousness is to determine the scope and content of the prior art and ascertain the differences between the prior art and the claims at issue. 383 U.S. 1, 17-18 (1966). "In determining (such) differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." MPEP § 2141.02. "The question of obviousness must be resolved on the basis of these factual determinations," and "[w]hile each case is different and must be decided on its own facts, the *Graham* factors, including secondary considerations when present, are the controlling inquiries in any obviousness analysis." MPEP § 2141.

In the Office Action, the Examiner alleges that Lemon discloses "phenolic resin compositions which are comprised of esterified phenolic compounds, phenolic resin composition, and a base" as applicable to Applicants' claim 1, citing col. 2, lines 14-23 of Lemon. However, and as previously discussed herein, Lemon does not disclose "a conductive-material doped ester-

cured alkaline phenolic resole resin containing conducting alkaline salts" as claimed in claim 1 of the present Application. Given this express teaching away of Applicants' claimed invention within Lemon, Applicants respectfully submit that any question of obviousness of claim 1 of the present application, in view of the disclosure of Lemon, is resolved in favor of Applicants.

Applicants respectfully submit that the rejection of claims 2-10 as allegedly being obvious under 35 U.S.C. § 103(a) are all now moot and should be withdrawn because each of these claims depend from non-obvious independent claim 1. "If an independent claim is not obvious under 35 U.S.C. §103, then any claim depending therefrom is not obvious." MPEP § 2143.03 (citing *In re Fine*, 837 F.2d 1382, 1385 (C.C.P.A. 1970)).

For the foregoing reasons, Applicants respectfully submit that the rejection of claims 1-10 as allegedly being obvious under 35 U.S.C. § 103(a) should be withdrawn. Moreover, Applicants respectfully submit that the rejection of claim 11 is now moot because claim 11 has been cancelled from the Application.

VI. Preliminary Request for Rejoinder.

As referenced by the Examiner within page 3 of the Office Action, "if the elected claims are found allowable, the rejected claims can be rejoined if they are drawn to the same limitations of the allowed claims." In the present Response, Applicants respectfully submit that they have demonstrated that claim 1 contains patentable subject matter, namely, and at a minimum, the element of "a conductive-material doped ester-cured alkaline phenolic resole resin containing conducting alkaline salts." Withdrawn independent claim 12 contains the limitation of a plate comprising "an ester-cured alkaline phenolic resole resin containing conducting alkaline salts", independent claim 16 contains the limitation of an electrolyte comprising "an ester-cured

alkaline phenolic resole resin containing conducting alkaline salts", and independent claim 18 contains the limitation that one or more of the items referenced within said claim comprises "an ester-cured alkaline phenolic resole resin containing conducting alkaline salts."

Applicants respectfully request that the Examiner rejoin withdrawn independent claims 12, 16, and 18, and the claims dependent thereon, allowing said claims along with claims 1-10 and 35 of the Application because each of these claims contain the same allowable claim limitation as claim 1. Applicants respectfully make this request to expedite the overall prosecution of the present claims and the withdrawn claims of the Application. Should the Examiner have any specific questions or concerns regarding this request, or if the Examiner would like to propose a potential Examiner's amendment regarding the same, please contact the undersigned.

VII. Applicants Petition for an Extension of Time.

Applicants respectfully petition for an extension of time of one (1) month, under 37 C.F.R. § 1.136(a), thereby extending the deadline for response, pursuant to 37 C.F.R. §§ 1.7(a) & 1.136(a), to Friday, June 5, 2009. Applicants authorize payment for this extension in the amount of \$65.00 (small entity) via credit card at the time of electronically filing the present Response.

Commissioner for Patents
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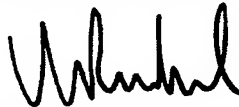
CONCLUSION

For all of the foregoing reasons, it is respectfully submitted that claims 1-10 and 35 are allowable claims and that Applicants have made a patentable contribution to the art. Favorable reconsideration and allowance of claims 1-10 and 35 of this Application is therefore respectfully requested.

In the event Applicants have inadvertently overlooked the need for payment of an additional fee, Applicants conditionally petition therefor, and authorize any deficiency to be charged to deposit account 09-0007. When doing so, please reference the docket number P01313-US-00 (13030.0002). Should the Examiner have any questions regarding the present Response, please contact the undersigned.

Respectfully submitted,

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